

**IN THE CLAIMS:**

Kindly cancel claims 10, 11, and 28 to 30 as follows:

5           1. (Canceled)

2. (Previously amended) The free-cutting tool steel according to Claim 8, wherein said machinability improving compound phase mainly comprises a component phase expressed by a composition formula  $M_4Q_2C_2$  (where M represents the metallic element component mainly comprises Ti and/or Zr, and Q represents at least any one of S, Se and Te).

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3. (Canceled)

15           4. (Previously amended) The free-cutting tool steel according to Claim 8, wherein Si amount is 2.0 wt% or less, Al amount is 0.1 wt% or less and N amount is 0.040 wt% or less.

5. (Previously amended) The free-cutting tool steel according to Claim 8, further containing at least any one element selected from Ca in an amount of 0.0050 wt% or less, Pb in an amount of 0.2 wt% or less, Bi in an amount of 0.2 wt% or less, B in an amount of 0.010 wt% or less, Nb and/or Ta so that  $Nb + 0.5Ta$  amounts to 0.05 wt% or less, and a rare earth metal in an amount of 0.50 wt% or less.

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6. (Canceled)

7. (Canceled)

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8. (Previously amended) A free-cutting tool steel containing Fe as a major component and C in an amount of 0.2 to 0.6 wt%;

containing Ti and/or Zr so that  $W_{Ti} + 0.52W_{Zr}$  amounts to 0.03 to 3.5 wt%, where  $W_{Ti}$  represents Ti content (wt%) and  $W_{Zr}$  represents Zr content (wt%);

5 containing at least any one of S, Se and Te so that  $W_S + 0.4W_{Se} + 0.25W_{Te}$  amounts to 0.01 to 1.0 wt%, and so that  $(W_{Ti} + 0.52W_{Zr})/(W_S + 0.4W_{Se} + 0.25W_{Te})$  amounts to 1 to 4, where  $W_S$  represents S content (wt%),  $W_{Se}$  represents Se content (wt%) and  $W_{Te}$  represents Te content (wt%);

10 having dispersed in a texture thereof a machinability improving compound phase within a range from 0.1 to 10% in terms of area ratio in a section;

said machinability improving compound phase comprising a metallic element component having Ti and/or Zr as major components, and a binding component for such metallic element component essentially containing C and also containing at least any one of S, Se and Te; and

15 essentially containing Cr in an amount of 4.24 to 7 wt%; and

containing at least any one element selected from Mn in an amount of 2.0 wt% or less, Ni in an amount of 2.5 wt% or less, Mo and/or W so that  $Mo + 0.5W$  amounts to 4.0 wt% or less, V in an amount of 2 wt% or less, and Co in an amount of 5.0 wt% or less.

20 9. (Original) The free-cutting tool steel according to Claim 8 used as a source material for hot forming die.

10. (Canceled)

25 11. (Canceled)

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12. (Previously amended) A free-cutting tool steel containing Fe as a major component and C in an amount of 0.5 to 2.5 wt%;

containing Ti and/or Zr so that  $W_{Ti} + 0.52W_{Zr}$  amounts to 0.03 to 3.5 wt%, where  $W_{Ti}$  represents Ti content (wt%) and  $W_{Zr}$  represents Zr content (wt%);

5 containing at least any one of S, Se and Te so that  $W_S + 0.4W_{Se} + 0.25W_{Te}$  amounts to 0.01 to 1.0 wt%, and so that  $(W_{Ti} + 0.52W_{Zr})/(W_S + 0.4W_{Se} + 0.25W_{Te})$  amounts to 1 to 4, where  $W_S$  represents S content (wt%),  $W_{Se}$  represents Se content (wt%) and  $W_{Te}$  represents Te content (wt%);

10 having dispersed in a texture thereof a machinability improving compound phase within a range from 0.1 to 10% in terms of area ratio in a section;

said machinability improving compound phase comprising a metallic element component having Ti and/or Zr as major components, and a binding component for such metallic element component essentially containing C and also containing at least any one of S, Se and Te;

15 essentially containing Cr in an amount of 4 to 17 wt%; and

containing at least any one element selected from Mn in an amount of 2.0 wt% or less, Ni in an amount of 1.0 wt% or less, Mo and/or W so that  $Mo + 0.5W$  amounts to 1.5 wt% or less, V in an amount of 1 wt% or less, and Co in an amount of 1.0 wt% or less.

20 13. (Original) The free-cutting tool steel according to Claim 12 used as a source material for cold forming die.

14.(Currently amended) A free-cutting tool steel containing Fe as a major component and C in an amount of 0.5 to 2.0 wt%;

25 containing Ti and/or Zr so that  $W_{Ti} + 0.52W_{Zr}$  amounts to 0.03 to 3.5 wt%, where  $W_{Ti}$  represents Ti content (wt%) and  $W_{Zr}$  represents Zr content (wt%);

30 containing at least any one of S, Se and Te so that  $W_S + 0.4W_{Se} + 0.25W_{Te}$  amounts to 0.01 to 1.0 wt%, and so that  $(W_{Ti} + 0.52W_{Zr})/(W_S + 0.4W_{Se} + 0.25W_{Te})$  amounts to 1 to 4, where  $W_S$  represents S content (wt%),  $W_{Se}$  represents Se content (wt%) and  $W_{Te}$  represents Te content (wt%);

having dispersed in a texture thereof a machinability improving compound phase within a range from 0.1 to 10% in terms of area ratio in a section;

said machinability improving compound phase comprising a metallic element component having Ti and/or Zr as major components, and a binding component for such metallic element component essentially containing C and also containing at least any one of S, Se and Te; and

containing at least any three elements selected from Cr as an essential element in an amount of 3 to 7 wt%, Mo and/or W as an essential element so that  $Mo + 0.5W$  amounts to 4 to 12 wt%, V as an essential element in an amount of 0.5 to 6.0 wt%, Mn in an amount of 2.0 wt% or less, Ni in an amount of 1.0 wt% or less, and Co in an amount of 15.0 wt% or less.

15. (Original) The free-cutting tool steel according to Claim 14 used as a source material for cutting tool, cold forming die or hot forming die.

16. (Previously amended) A free-cutting tool steel containing Fe as a major component and C in an amount of 0.001 to 0.4 wt%; and

further containing Ni in an amount of 1 to 5 wt% Cu in an amount of 0.5 to 5 wt%, Al in an amount of 0.5 to 3 wt%, and Cr in an amount of less than 10 wt%;

wherein such tool steel further contains:

Ti and/or Zr so that  $X \text{ (wt\%)} = W_{Ti} + 0.52W_{Zr}$  amounts to 0.03 to 3.5 wt%, where  $W_{Ti}$  represents Ti content (wt%) and  $W_{Zr}$  represents Zr content (wt%);

at least any one of S, Se and Te so that  $Y \text{ (wt\%)} = W_S + 0.4W_{Se} + 0.25W_{Te}$  amounts to 0.01 to 1 wt%, where  $W_S$  represents S content (wt%),  $W_{Se}$  represents Se content (wt%) and  $W_{Te}$  represents Te content (wt%); and

having dispersed in a texture thereof a machinability improving compound phase;

said machinability improving compound phase comprising a metallic element component having Ti and/or Zr as major components, and a binding component for such metallic element component essentially containing C and also containing at least any one of S, Se and Te; and

the values X and Y are defined so as to satisfy a relation of  $1 \leq X/Y \leq 4$ .

17. (Canceled)

5 18. (Previously amended) The free-cutting tool steel according to Claim 16, wherein said machinability improving compound phase mainly comprises a component phase expressed by a composition formula  $M_4Q_2C_2$  (where M represents the metallic element component mainly comprises Ti and/or Zr, and Q represents at least any one of S, Se and Te).

10 19. (Original) The free-cutting tool steel according to Claim 16 having a ratio of Charpy impact values  $I_T/I_L$  of 0.3 or above, where

$I_T$  is a Charpy impact value of a T-directional test piece and  $I_L$  is a Charpy impact value of an L-directional test piece:

15 said impact values being obtained in Charpy impact test specified by JIS Z2242; and

said T-directional test piece and L-directional test piece being fabricated as No. 3 test pieces specified in JIS Z2202 by notching a forged-and-rolled product of such tool steel along the directions parallel to and normal to the forging-and-rolling direction, 20 respectively.

20. (Original) The free-cutting tool steel according to Claim 16, wherein said machinability improving compound phase observed in a polished surface of such tool steel has an area ratio of 0.1 to 10%.

25 21. (Original) The free-cutting tool steel according to Claim 16 satisfying relations of

$$0.2X \leq Y \leq X; \text{ and}$$

$$0.07X \leq W_C \leq 0.75X$$

30 where  $W_C$  represents C content (wt%).

22. (Previously amended) The free-cutting tool steel according to Claim 16 further containing at least any one element selected from Mo and/or W so that  $W_{Mo} + 0.5W_W$  amounts to 4 wt% or less, where  $W_{Mo}$  represents Mo content (wt%) and  $W_W$  represents W content (wt%), Mn in an amount of 3 wt% or less, Co in an amount of 2 wt% or less, Nb in an amount of 1 wt% or less and V in an amount of 1 wt% or less.

23. (Original) The free-cutting tool steel according to Claim 16 wherein Si amount is 2 wt% or less, N amount is 0.04 wt% or less, and O amount is 0.03 wt% or less.

24. (Previously amended) The free-cutting tool steel according to Claim 16 further containing at least any one element selected from Ca in an amount of 0.005 wt% or less, Pb in an amount of 0.2 wt% or less, Bi in an amount of 0.2 wt% or less, Ta in an amount of 0.05 wt% or less, B in an amount of 0.01 wt% or less, and a rare earth metal element in an amount of 0.5 wt% or less.

25. (Canceled)

26. (Canceled)

27. (Original) The free-cutting tool steel according to Claim 16 used as a source material for die for molding plastics.

28. (Canceled)

29. (Canceled)

30. (Canceled)

31. (Previously added) The free-cutting tool steel according to Claim 12, wherein said machinability improving compound phase mainly comprises a component phase expressed by a composition formula  $M_4Q_2C_2$  (where M represents the metallic element component mainly comprises Ti and/or Zr, and Q represents at least any one of S, Se and Te).

32. (Previously added) The free-cutting tool steel according to Claim 12 wherein Si amount is 2.0 wt% or less, Al amount is 0.1 wt% or less and N amount is 0.040 wt% or less.

33. (Previously added) The free-cutting tool steel according to Claim 12 further containing at least any one element selected from Ca in an amount of 0.0050 wt% or less, Pb in an amount of 0.2 wt% or less, Bi in an amount of 0.2 wt% or less, B in an amount of 0.010 wt% or less, Nb and/or Ta so that Nb + 0.5Ta amounts to 0.05 wt% or less, and a rare earth metal in an amount of 0.50 wt% or less.

34. (Previously added) The free-cutting tool steel according to Claim 14, wherein said machinability improving compound phase mainly comprises a component phase expressed by a composition formula  $M_4Q_2C_2$  (where M represents the metallic element component mainly comprises Ti and/or Zr, and Q represents at least any one of S, Se and Te).

35. (Previously added) The free-cutting tool steel according to Claim 14 wherein Si amount is 2.0 wt% or less, Al amount is 0.1 wt% or less and N amount is 0.040 wt% or less.

36. (Previously added) The free-cutting tool steel according to Claim 14 further containing at least any one element selected from Ca in an amount of 0.0050 wt% or less, Pb in an amount of 0.2 wt% or less, Bi in an amount of 0.2 wt% or less, B in an amount of 0.010 wt% or less, Nb and/or Ta so that  $Nb + 0.5Ta$  amounts to 0.05 wt% or less, and a  
 5 rare earth metal in an amount of 0.50 wt% or less.

37. (Previously added) A free-cutting tool steel containing Fe as a major component and C in an amount of 0.033 to 0.6 wt%; and  
 further containing Ni in an amount of 6 wt% or less, Cu in an amount of 5 wt% or  
 10 less, Al in an amount of 3 wt% or less and Cr in an amount of 10 to 22 wt% or less;  
 wherein such tool steel further contains:  
 Ti and/or Zr so that  $X \text{ (wt\%)} = W_{Ti} + 0.52W_{Zr}$  amounts to 0.03 to 3.5 wt%, where  $W_{Ti}$  represents Ti content (wt%) and  $W_{Zr}$  represents Zr content (wt%);  
 at least any one of S, Se and Te so that  $Y \text{ (wt\%)} = W_S + 0.4W_{Se} + 0.25W_{Te}$   
 15 amounts to 0.01 to 1 wt%, where  $W_S$  represents S content (wt%),  $W_{Se}$  represents Se content (wt%) and  $W_{Te}$  represents Te content (wt%); and  
 having dispersed in a texture thereof a machinability improving compound phase;  
 said machinability improving compound phase comprising a metallic element component having Ti and/or Zr as major components, and a binding component for such  
 20 metallic element component essentially containing C and also containing at least any one of S, Se and Te; and  
 the values X and Y are defined so as to satisfy a relation of  $1 \leq X/Y \leq 4$ .

38. (Previously added) The free-cutting tool steel according to Claim 37, wherein  
 25 said machinability improving compound phase mainly comprises a component phase expressed by a composition formula  $M_4Q_2C_2$  (where M represents the metallic element component mainly comprises Ti and/or Zr, and Q represents at least any one of S, Se and Te).

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39. (Previously added) The free-cutting tool steel according to Claim 37 having a ratio of Charpy impact values  $I_T/I_L$  of 0.3 or above, where

$I_T$  is a Charpy impact value of a T-directional test piece and  $I_L$  is a Charpy impact value of an L-directional test piece:

5        said impact values being obtained in Charpy impact test specified by JIS Z2242;  
and

      said T-directional test piece and L-directional test piece being fabricated as No. 3  
test pieces specified in JIS Z2202 by notching a forged-and-rolled product of such tool  
steel along the directions parallel to and normal to the forging-and-rolling direction,  
10        respectively.

40. (Previously added) The free-cutting tool steel according to Claim 37, wherein  
said machinability improving compound phase observed in a polished surface of such tool  
steel has an area ratio of 0.1 to 10%.

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41. (Previously added) The free-cutting tool steel according to Claim 37  
satisfying relations of

$$0.2X \leq Y \leq X; \text{ and}$$

$$0.07X \leq W_C \leq 0.75X$$

20        where  $W_C$  represents C content (wt%).

42. (Previously added) The free-cutting tool steel according to Claim 37 further  
containing at least any one element selected from Mo and/or W so that  $W_{Mo} + 0.5W_W$   
amounts to 4 wt% or less, where  $W_{Mo}$  represents Mo content (wt%) and  $W_W$  represents W  
25        content (wt%), Mn in an amount of 3 wt% or less, Co in an amount of 2 wt% or less, Nb  
in an amount of 1 wt% or less and V in an amount of 1 wt% or less.

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43. (Previously added) The free-cutting tool steel according to Claim 37 wherein Si amount is 2 wt% or less, N amount is 0.04 wt% or less, and O amount is 0.03 wt% or less.

5           44. (Previously added) The free-cutting tool steel according to Claim 37 further containing at least any one element selected from Ca in an amount of 0.005 wt% or less, Pb in an amount of 0.2 wt% or less, Bi in an amount of 0.2 wt% or less, Ta in an amount of 0.05 wt% or less, B in an amount of 0.01 wt% or less, and a rare earth metal element in an amount of 0.5 wt% or less.

10           45. (Previously added) The free-cutting tool steel according to Claim 37 used as a source material for die for molding plastics.

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